

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the present application:

Listing of Claims:

Claim 1 (Currently Amended): An apparatus for actuating a control surface, comprising:

a first spur gear;

a first drive assembly engaged with the first spur gear;

a second spur gear;

a second drive assembly engaged with the second spur gear; and

a gear assembly mechanically capable of being coupled with the control surface and engaged with the spur gears; gears, the gear assembly comprising:

a first screw;

a first gear engaged with the first spur gear;

a thrust nut mounted to the first gear and threadedly engaged with the first screw;

a second gear engaged with the second spur gear;

a second screw mounted to the second gear and mechanically coupled with the thrust nut such that the second screw and the thrust nut rotate independently and translations of the thrust nut are transmitted to the second screw; and

a translation nut threadedly engaged with the second screw and capable of being mechanically coupled with the control surface.

Claim 2 (Original): An apparatus, according to claim 1, further comprising a central tube and a bearing disposed between each of the spur gears and the central tube.

Claim 3 (Original): An apparatus, according to claim 2, wherein the central tube comprises a blast tube.

Claim 4 (Original): An apparatus, according to claim 2, further comprising a housing and a thrust bar mounted to the housing and to the central tube, such that one end of the gear assembly is mounted to the thrust bar.

Claim 5 (Original): An apparatus, according to claim 1, wherein at least one of the drive assemblies further comprises:

a motor;

a speed reducer mounted to the motor and having an output shaft; and

a drive gear mounted to the output shaft and engaged with one of the spur gears.

Claim 6 (Canceled).

Claim 7 (Currently Amended): An apparatus, according to claim [[6]] 1, wherein:

the translation nut comprises a clevis; and

the apparatus further comprises a linkage mechanically coupled with the clevis and capable of being coupled with a clevis of a control surface shaft.

Claim 8 (Currently Amended): An apparatus, according to claim ~~[[6]]~~ 1, wherein the first screw is adapted for adjusting the gear assembly.

Claim 9 (Original): An apparatus, according to claim 1, wherein the first spur gear comprises a roll spur gear and the second spur gear comprises one of a pitch spur gear and a yaw spur gear.

Claim 10 (Original): An apparatus, according to claim 1, wherein:
the translation nut comprises a clevis; and
the apparatus further comprises a linkage mechanically coupled with the clevis and capable of being coupled with a clevis of a control surface shaft.

Claim 11 (Currently Amended): An apparatus, according to claim 1, further comprising:

a third spur gear;
a third drive assembly engaged with the first third spur gear; and
a second gear assembly mechanically coupled with a second control surface and engaged with the first spur gear and the third spur gear.

Claim 12 (Original): An apparatus, according to claim 11, wherein the first spur gear is a roll spur gear, the second spur gear is a pitch spur gear, and the third spur gear is a yaw spur gear.

Claim 13 (Original): An apparatus, according to claim 11, further comprising an actuation controller coupled with the drive assemblies, such that actuation commands may be transmitted from the actuation controller to the drive assemblies.

Claim 14 (Original): An apparatus, according to claim 1, further comprising an actuation controller coupled with the drive assemblies, such that actuation commands may be transmitted from the actuation controller to the drive assemblies.

Claim 15 (Currently Amended): A vehicle, comprising:

a control surface; and

an apparatus for actuating the control surface, comprising:

a first spur gear;

a first drive assembly engaged with the first spur gear;

a second spur gear;

a second drive assembly engaged with the second spur gear; and

a gear assembly mechanically coupled with the control surface and engaged with the spur gears. gears, the gear assembly comprising:

a first screw;

a first gear engaged with the first spur gear;

a thrust nut mounted to the first gear and threadedly engaged with the first screw;

a second gear engaged with the second spur gear;

a second screw mounted to the second gear and mechanically coupled with the thrust nut such that the second screw and the thrust nut rotate independently and translations of the thrust nut are transmitted to the second screw; and

a translation nut threadedly engaged with the second screw and capable of being mechanically coupled with the control surface.

Claim 16 (Original): A vehicle, according to claim 15, further comprising a central tube and a bearing disposed between each of the spur gears and the central tube.

Claim 17 (Original): A vehicle, according to claim 16, wherein the central tube comprises a blast tube.

Claim 18 (Original): A vehicle, according to claim 16, further comprising a housing and a thrust bar mounted to the housing and to the central tube, such that one end of the gear assembly is mounted to the thrust bar.

Claim 19 (Original): A vehicle, according to claim 15, wherein at least one of the drive assemblies further comprises:

a motor;

a speed reducer mounted to the motor and having an output shaft; and
a drive gear mounted to the output shaft and engaged with one of the spur gears.

Claim 20 (Canceled).

Claim 21 (Currently Amended): A vehicle, according to claim 20 15, wherein:
the translation nut comprises a first clevis;
the control surface comprises a shaft including a second clevis; and
the apparatus further comprises a linkage mechanically coupling first clevis and
the second clevis.

Claim 22 (Currently Amended): A vehicle, according to claim 20 15, wherein
the first screw is adapted for adjusting the gear assembly.

Claim 23 (Original): A vehicle, according to claim 15, wherein the first spur gear
comprises a roll spur gear and the second spur gear comprises one of a pitch spur gear
and a yaw spur gear.

Claim 24 (Original): A vehicle, according to claim 15, wherein:
the control surface comprises a shaft including a first clevis;
the gear assembly comprises a second clevis; and
the apparatus further comprises a linkage coupling the first clevis and the second
clevis.

Claim 25 (Currently Amended): A vehicle, according to claim 15, further comprising:

a third spur gear;

a third drive assembly engaged with the first third spur gear; and

a second gear assembly mechanically coupled with a second control surface and engaged with the first spur gear and the third spur gear.

Claim 26 (Original): A vehicle, according to claim 25, wherein the first spur gear is a roll spur gear, the second spur gear is a pitch spur gear, and the third spur gear is a yaw spur gear.

Claim 27 (Original): A vehicle, according to claim 25, further comprising an actuation controller coupled with the drive assemblies, such that actuation commands may be transmitted from the actuation controller to the drive assemblies.

Claim 28 (Original): A vehicle, according to claim 15, further comprising an actuation controller coupled with the drive assemblies, such that actuation commands may be transmitted from the actuation controller to the drive assemblies.

Claims 29- 37 (Canceled).

Claim 38 (New): An apparatus for actuating a control surface, comprising:

- a first spur gear;
- a first drive assembly engaged with the first spur gear;
- a second spur gear;
- a second drive assembly engaged with the second spur gear;
- a gear assembly mechanically capable of being coupled with the control surface and engaged with the spur gears;
- a blast tube; and
- a bearing disposed between each of the spur gears and the blast tube.

Claim 39 (New): An apparatus, according to claim 38, further comprising:

- a third spur gear;
- a bearing disposed between the third spur gear and the blast tube;
- a third drive assembly engaged with the third spur gear; and
- a second gear assembly mechanically coupled with a second control surface and engaged with the first spur gear and the third spur gear.

Claim 40 (New): An apparatus, according to claim 38, further comprising:

- a housing; and
- a thrust bar mounted to the housing and to the blast tube, such that one end of the gear assembly is mounted to the thrust bar.

Claim 41 (New): An apparatus, according to claim 38, wherein at least one of the first drive assembly and the second drive assembly comprises:

- a motor;

- a speed reducer mounted to the motor, the speed reducer having an output shaft; and

- a drive gear mounted to the output shaft and engaged with one of the first spur gear and the second spur gear.

Claim 42 (New): An apparatus, according to claim 38, wherein the first spur gear is a roll spur gear and the second spur gear is one of a pitch spur gear and a yaw spur gear.

Claim 43 (New): A vehicle, comprising:

- a control surface; and

- an apparatus for actuating the control surface, the apparatus comprising:

 - a first spur gear;

 - a first drive assembly engaged with the first spur gear;

 - a second spur gear;

 - a second drive assembly engaged with the second spur gear;

 - a gear assembly mechanically capable of being coupled with the control surface and engaged with the spur gears;

 - a blast tube; and

 - a bearing disposed between each of the spur gears and the blast tube.

Claim 44 (New): A vehicle, according to claim 43, the apparatus further comprising:

- a third spur gear;
- a bearing disposed between the third spur gear and the blast tube;
- a third drive assembly engaged with the third spur gear; and
- a second gear assembly mechanically coupled with a second control surface and engaged with the first spur gear and the third spur gear.

Claim 45 (New): A vehicle, according to claim 43, the apparatus further comprising:

- a housing; and
- a thrust bar mounted to the housing and to the blast tube, such that one end of the gear assembly is mounted to the thrust bar.

Claim 46 (New): A vehicle, according to claim 43, wherein at least one of the first drive assembly and the second drive assembly comprises:

- a motor;
- a speed reducer mounted to the motor, the speed reducer having an output shaft; and
- a drive gear mounted to the output shaft and engaged with one of the first spur gear and the second spur gear.

Claim 47 (New): A vehicle, according to claim 43, wherein the first spur gear is a roll spur gear and the second spur gear is one of a pitch spur gear and a yaw spur gear.

Claim 48 (New): A method for actuating a control surface, comprising the steps of:

actuating at least one of a first drive assembly and a second drive assembly;

if the first drive assembly is actuated:

rotating a first spur gear with the first drive assembly;

rotating a first gear with the first spur gear;

translating a thrust nut along a first screw with the first gear; and

transmitting the translation of the thrust nut to a second screw, such that the second screw and the thrust nut rotate independently; and

if the second drive assembly is actuated:

rotating a second spur gear with the second drive assembly;

rotating a second gear with the second spur gear;

rotating a second screw with the second gear; and

moving a translation nut with the second screw to actuate the control surface.